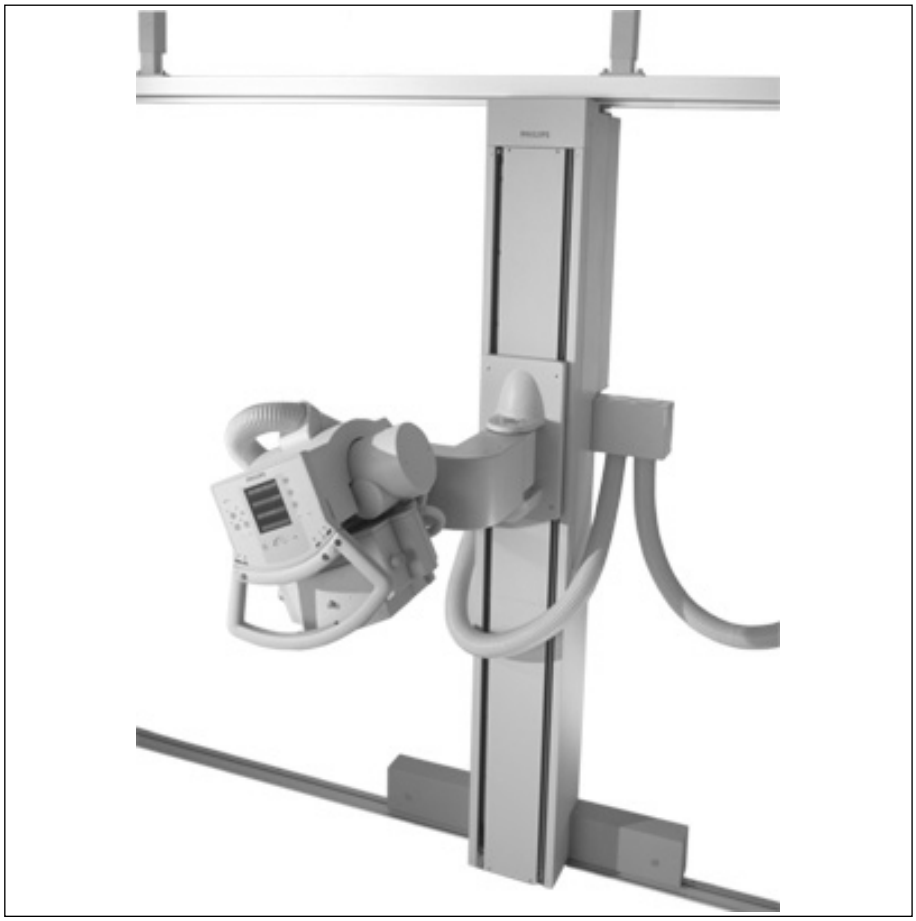
radiography



INSTRUCTIONS FOR USE

BuckyDiagnost FS

Movable floor stands

Release 5

English

4512 109 26531 AA/704 – 10.2003

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1 Facts Worth Knowing

1.1 Normal Use 5
1.2 Prohibited Use 5
1.3 Version 5
1.4 For safe operation 5
1.5 Conformity 6
1.6 Training 6

2 Safety

2.1 About this manual 7
2.2 Electrical safety 7
2.3 Mechanical safety 7
2.4 Electromagnetic compatibility (EMC) 8
2.5 Radiation protection 8
2.6 Disposal 9

3 Description

3.1 The main components 10
3.2 Design and functioning 11
3.3 Controls on the control grip of the automatic collimator 14
3.4 Controls of the control grip of the manual collimator 16

4 Operation

4.1 Tube assembly 18
4.2 Manual collimator 23
4.3 Automatic collimator 24
4.4 Operating the extended version 28

5 Maintenance

5.1 Tests by the user 37
5.2 Safety checks according to the Medical Device Directive 37
5.3 Maintenance 38
5.4 Recording results 39
5.5 Cleaning 39
5.6 Disinfection 39

6 Technical data

7 Appendix

7.1 Messages 44

Index

1 Facts Worth Knowing

1.1 Normal Use

The BuckyDiagnost FS is used for making X-ray exposures on a patient table or at a wall Bucky, for example.

1.2 Prohibited Use

You must not use the tube assembly for ”resting“ limbs.

1.3 Version

This version of the Instructions for Use corresponds to the latest version of the X-ray equipment at the time of going to press.

This X-ray equipment is available in various configurations. These Instructions for Use describe the largest possible configuration. It is therefore possible that functions (indicated as optional) are described which do not form part of your unit.

1.4 For safe operation

- If the user wishes to connect the X-ray equipment to other equipment, components or assemblies and if it is not apparent from the technical data whether it can be safely combined with such equipment, components or assemblies, the user must ensure that the safety of the patient, operating staff and the environment is not affected by the planned combination by consulting the manufacturers involved or by making enquiries from an expert.
- Philips is responsible for the safety features of its products only if maintenance, repairs and modifications have been performed by Philips or by persons explicitly authorised to do so by Philips.
- As with any technical appliance, this equipment requires not only correct operation but also regular, competent maintenance and care, which are described in the section ”Maintenance“.
- If you operate the X-ray equipment incorrectly or if the user fails to have maintenance carried out properly, Philips cannot be held liable for any malfunctions, damage or injuries.
- Safety circuits must be neither removed nor modified.
- You may remove or open parts of the housing only if you are instructed to do so in this manual.

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1.5 Conformity

This Medical Device meets the provisions of the Medical Device Directive MDD 93/42 EEC (93).
If you have further questions regarding the applicable national or international standards, please address them to:

Philips Medical Systems DMC GmbH
Quality Assurance Department
Roentgenstrasse 24
D-22335 Hamburg
Fax: (+49) 40/5078-2147

1.6 Training

The X-ray equipment may only be operated by persons who have the necessary expertise in radiation protection or knowledge of radiation protection and who have been instructed in how to operate the X-ray equipment.

2 Safety

2.1 About this manual

This manual is intended to enable you to work safely with the X-ray equipment described. You may only use this equipment in compliance with the safety instructions in this manual and not for purposes other than those for which it is intended.

It is always the user who is responsible for complying with the regulations which apply to the setting up and operation of X-ray equipment.

The BuckyDiagnost FS floor stand is part of an X-ray system. If there is any interaction with other components of the system, these Instructions for Use contain extracts from other manuals. You will find further information in the manual of the relevant component.

2.2 Electrical safety

This X-ray equipment meets the safety class I and type B according to IEC 60601-1.

Only trained maintenance staff may remove the covers from the high-voltage cable of the X-ray tube assembly and the high-voltage generator.

This X-ray equipment may only be operated in medical rooms which meet IEC requirements.

- ***You must never operate this X-ray equipment in areas where there is a risk of explosion.***
- ***Detergents and disinfectants, including those used on patients, may create explosive mixtures of gases. Please observe the relevant regulations.***

2.3 Mechanical safety

- ***Please ensure that neither the patient nor yourself allows hands to enter the radius of movement of the X-ray equipment and that no parts of clothing are caught by it.***
- ***Remove all objects from the radius of movement of the X-ray equipment.***

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2.4 Electromagnetic compatibility (EMC)

In accordance with its intended use, this electronic apparatus complies with the law governing EMC, which defines the permitted emission levels from electronic equipment and its required immunity against electromagnetic fields.

Nevertheless, it is not possible to exclude with absolute certainty the possibility that radio signals from high-frequency transmitters, e.g. mobile phones or similar mobile radio equipment, which themselves conform to the EMC regulations, may influence the proper functioning of electromedical apparatus if such equipment is operated in close proximity and with relatively high transmitting power. Therefore, operation of such radio equipment in the immediate vicinity of electronically controlled medical apparatus should be avoided to eliminate any risk of interference.

Explanation:
Electronic apparatus that satisfies the EMC requirements is designed so that under normal conditions there is no risk of malfunction caused by electromagnetic interference. However, in the case of radio signals from high-frequency transmitters with a relatively high transmitting power, the risk of electromagnetic incompatibility when operated in close proximity to electronic apparatus cannot be totally ruled out.

In unusual circumstances unintended functions of the apparatus could be initiated, possibly giving rise to undesirable risks for the patient or user.

For this reason, all kinds of transmission with mobile radio equipment should be avoided. This also applies when the apparatus is in ”standby“ mode.
Mobile telephones must be **switched off** in designated problem zones.

2.5 Radiation protection

- ***Ensure that before performing any radiography all the necessary radiation precautions have been taken.***
- ***Personnel in the examination room must comply with the valid radiation protection regulations when using X-rays. Please comply with the following rules:***
- ***To protect the patient against radiation always use radiation protection accessories in addition to devices which are fitted to the X-ray equipment (e.g. diaphragm, spacer, filter).***
- ***Wear protective clothing. Radiation protection aprons with a lead equivalent of 0.35 mm attenuate X-radiation at 50 kV by 99.84%, and at 100 kV by 91.2%.***

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- ***Distance is the most effective radiation protection. Keep as large a distance as possible away from the object exposed and the X-ray tube assembly. Scattered radiation is largely dependent on the volume of the object being exposed.***
- ***Wear a personal dosemeter. Philips recommends determining the personal dose occurring at the workplace under practical conditions and, where required, laying down any necessary radiation precautions, specifying the use of bar and/or finger-ring dosemeters in addition.***
- ***Always select a focal spot to skin distance as long as possible to keep the absorbed dose for the patient as low as could reasonably be possible.***
- ***Always be aware that any material brought into the path of radiation between the patient and the image receptor (e.g. film) will have a negative influence on the image quality as well as on the patient dose.***
- ***Always make sure that acoustic and visual communication between operator and patient is guaranteed also during exposure. If necessary, communication must be established with technical means, for instance, an intercom.***
- ***Safety circuits which may prevent X-radiation from being switched on under certain conditions may be neither removed nor modified.***

The laser light source

The light source of the light pointer is a Class 2 laser. Make sure that nobody looks directly into the light beam.

With Class 2 lasers the eye is protected by the eyelid closure reflex in the event of accidental, brief glances into the laser beam. Class 2 lasers may therefore be used without taking any further precautions, provided that it is not necessary to either look into the beam intentionally for longer than 0.25 s nor to repeatedly look into the laser beam or directly reflected beam. For continuous-duty Class 2 lasers the maximum limit for accessible radiation is 1 mW.

2.6 Disposal

Philips manufactures state-of-the-art X-ray equipment in terms of safety and environmental protection. Assuming no parts of the system housing are opened and assuming the system is used properly there are no risks to persons or the environment.

To comply with regulations it is necessary to use materials which may be harmful to the environment and therefore have to be disposed of in a proper manner.

For this reason you must not dispose of the X-ray equipment together with industrial or domestic waste.

Philips
- supports you in disposing of the X-ray equipment described in a proper manner
- returns reusable parts to the production cycle via certified disposal companies and
- thus helps to reduce environmental pollution.

Consequently, do contact your Philips Service Organisation in full confidence.

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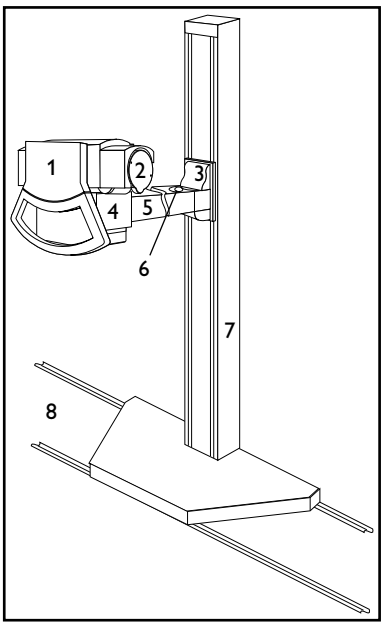
3 Description

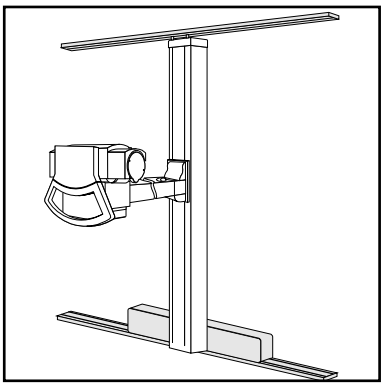
3.1 The main components

3.1.1 BuckyDiagnost FS S



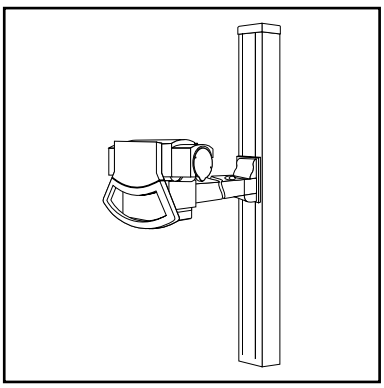
1 Control grip
2 Tube assembly
3 Vertical carriage
4 Collimator
5 Tube arm
6 Swivel joint
7 Stand
8 Floor rails

3.1.2 BuckyDiagnost FS C



Ceiling-wall version

3.1.3 BuckyDiagnost FS F



Fixed version

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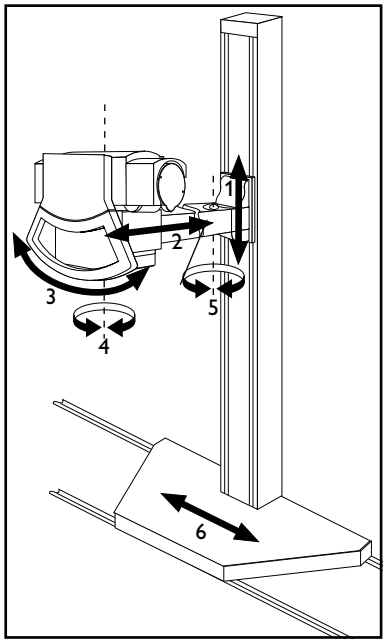
3.2 Design and functioning



The BuckyDiagnost FS is a mobile floor stand on rails, and is available in the following versions:

- floor stand
- floor-wall stand
- fixed special version without swivel.

The vertical carriage carries the swiveling tube arm, which is available with or without telescope extension. The tube arm carries the tube assembly, the collimator and the control grip.

For the possible movements please refer to the drawing opposite.

Colour-coding
The directions of movements are **colour-coded**. You will find the colours next to the corresponding buttons on the control grip and on the floor stand (possibly not visible).

They are as follows:
1 Raise/lower: **yellow**
2 Movement at right angles to the table top: **blue**
3 Rotation of tube assembly round its transverse axis: **black**
4 Rotation of collimator round the radiation beam axis
5 Swivel of the tube arm: **purple**
6 Movement along the table top: **green**

Automatic collimation (optional)
This consists of

- the automatic collimator
- a Bucky with cassette size sensing and
- the extended control grip.

If all the components are at a defined exposure position, the system detects the size of a cassette inserted and sets the collimator accordingly.

3.2.1 PBL (Positive Beam Limitation)

With a manual collimator, the radiation field changes with the SID. With an automatic collimator, **the size of the radiation field – including the field collimated manually – remains when the SID changes**.

If you change the SID by more than 2 cm with PBL after manual collimation, collimation to the cassette size takes place again. This function can be deactivated by Customer Service.

With automatic collimation it is not possible to expose beyond the size of the cassette.

3.2.2 Defined exposure positions

Thanks to the "floating" table top, it only requires one movement to position the patient in the central beam, which is faster than moving both the tube assembly and the Bucky carriage. This system is therefore designed for the centre position of the tube assembly and image receptor. You only have to move the Bucky carriage out of the centre position for a few exposures (e.g. skull, foot).

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For more convenient working, Customer Service can set several defined exposure positions according to the space available. In these exposure positions the LEDs on the control grip light up and display the locked-in status.

- At the patient table:
  - Bucky carriage at the centre position (automatic collimation operates throughout the entire range of movement)
  - Tube assembly at the centre position (longitudinally and transversely locked-in)
    or only transversely locked-in
    or only longitudinally locked-in (the automatic Bucky does not lock in place)
  - Tube assembly at preferred SID (automatic collimation operates throughout the entire setting range)
  - Radiation beam axis vertical.

Additionally, in the case of tomography:
- Table height in tomographic position with BuckyDiagnost TH2 (starting position for the tomographic height)
- Tomographic height.

- At the wall Bucky:
  Central beam axis horizontal
  - locked at SID (several SIDs are possible)

  Central beam axis vertical
  - tube assembly in the centre position (longitudinally and transversely locked-in)
  - with automatic collimation, positioning plate for the defined SID in the lower position (set by Customer Service)
  - tube assembly at preferred SID.

- Parking position

3.2.3 Automatic Bucky (optional)

The motorized cassette transport allows you to conveniently insert and remove the cassette. The Bucky senses the size of the cassette inserted. This information is used with the optional "Automatic sensing".

3.2.4 Interchangeable grid

(contained in the optional ”Automatic Bucky“)
You can change or remove the grid and thus optimally adjust the exposure conditions to the object.

3.2.5 Tomography

(optional, in combination with BuckyDiagnost FS S)
On the linear tomography unit without coupling rod you can collimate manually or automatically. For more convenient operation, the longitudinal and swivel movement of the tube assembly and the Bucky carriage movement are servo-assisted. The tomography parameters can be selected on the extended control grip.

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3.2.6 Tracking for the SID (optional)

Tracking is only possible in conjunction with automatic collimation. It means the tube assembly and positioning plate of the wall Bucky or the tube assembly and table top are synchronised during vertical movement. The tomography parameters can be selected on the extended control grip.

3.2.7 Tracking for the image receptor

(optional, part of the ”Automatic collimator“ and ”Tomography“ combination)
In combination with tomography, you can carry out motorized movement of the Bucky carriage (centre of image receptor) into the central beam. The system collimates automatically.

3.2.8 Control grip

(extended version, part of the ”Automatic collimation“ and ”Tomography“ options)
The extended version of the control grip is designed for the maximum system configuration, so that some controls and displays have no function if the corresponding option is not installed in the system.

With the extended version you can call up a help text on the display by pressing (Test) in the event that you do not receive a ready-for-exposure signal. Some texts are only of importance for Customer Service and are marked accordingly. You will find a list of help texts in the Appendix.

3.2.9 Key-operated switch

(part of the ”Automatic collimation“ option)
In the event of an error you can switch off the ”Automatic collimation“ function.

3.2.10 Mode display

This displays the currently active mode:
”A“ - automatic collimation (sensing)
”AT“ - automatic collimation and tracking
”M“ - manual
”MT“ - manual and tracking

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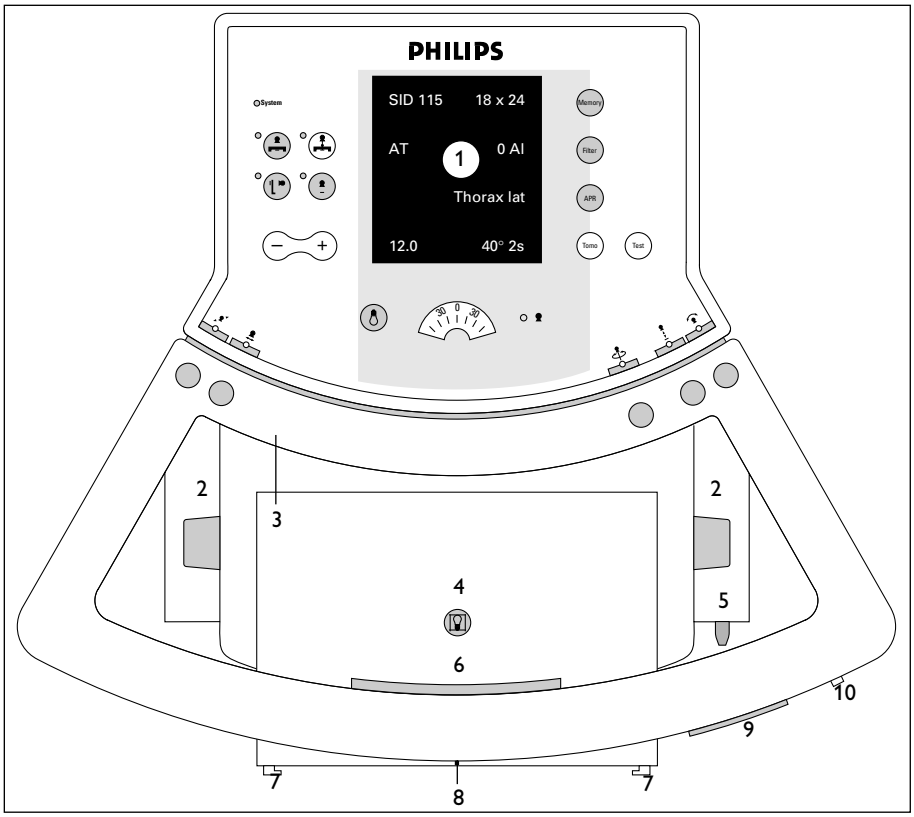
3.3 Controls on the control grip of the automatic collimator



No.	Description
1	Display panel
2	Knobs (right/left) for setting the collimator
3	Key-operated switch (not in view)
4	Switch on light beam lamp
5	Tape measure for measuring SID (source-image distance)
6	Button for enabling – longitudinal tube assembly movement and – transverse tube assembly movement and – raising/lowering tube assembly
7	Rails for accessories
8	Central laser
9	Slider for covering the SID laser and the central laser
10	SID laser (flashing, optional)

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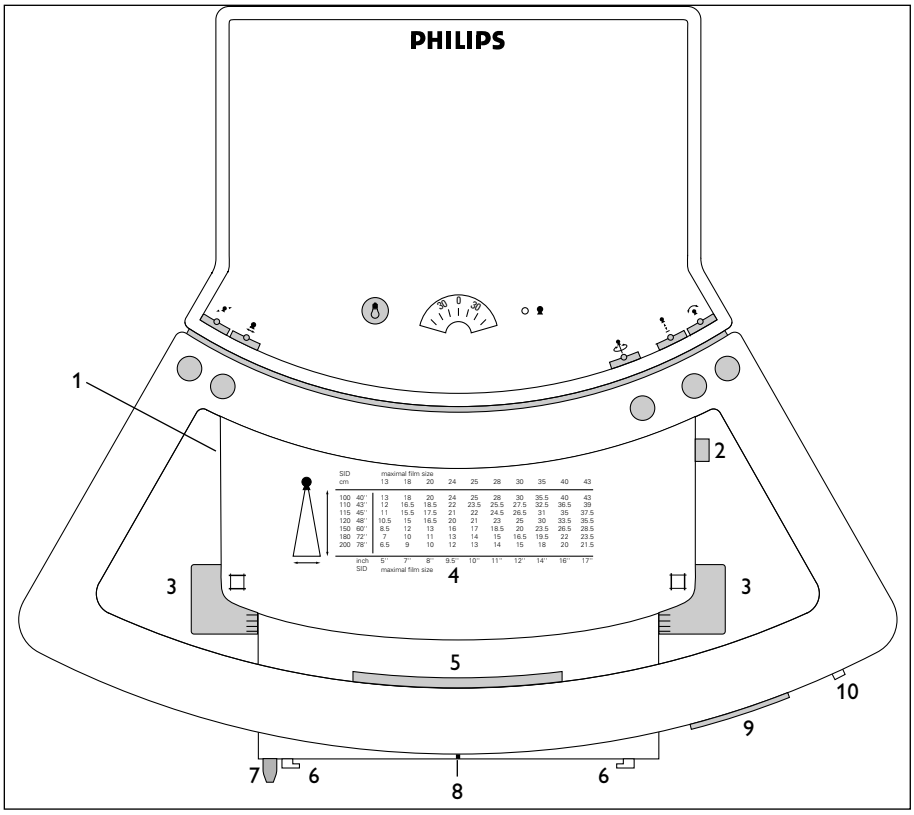
Key/display	Description
○ System	Ready for exposure
○	Tube assembly selected
	Bucky (AUX 1)
	Tomography unit (AUX 2)
	Wall Bucky (AUX 3)
	”Free“ cassette (AUX 4)
	Decrease/increase tomographic height (from table top)
SID 115	SID in cm; the Service Organisation can set inch.
18 x 24	Radiation area in cm; the Service Organisation can set inch
AT	Mode display
0 Al	Added filter
Thorax lat	APR program
12.0	Tomographic height in cm
40° 2s	Tomographic angle, Tomographic time
Restricted use	Operation with key-operated switch
	Collimator – set to the last value set manually (e.g. after cassette change) – set to full size
	– Select added filter in the radiation beam or – Change the value preset by the APR programme
	Select APR programme (4 per auxiliary)
	Select tomographic programme (angle, time)
	– Start test run for tomographic exposure (without radiation) – Call up help text if no ready for exposure is displayed
	Switch on light field indicator and light pointer (they switch off automatically; the SID laser lights at ”free“ cassette too)
	Indication of angle when tube assembly is rotated
	Enable transverse tube assembly movement (blue)
	Enable longitudinal tube assembly movement (green)
	Enable rotation of the tube assembly round the column (violet)
	Enable vertical tube assembly movement (yellow)
	Enable tube assembly swivel round its transverse axis (black)

3.4 Controls of the control grip of the manual collimator



No.	Description
1	Rotating disk for added filters
2	Switch light field indicator ON
3	Knobs for setting the collimator
4	Settings table
5	Enable button for – moving the tube assembly longitudinally and – moving the tube assembly transversally and – raising/lowering the tube assembly
6	Accessory rails
7	Tape measure for measuring SID (source-image distance)
8	Slit for the central laser
9	Slider for covering the SID laser and the central laser
10	SID laser (flashing, option)

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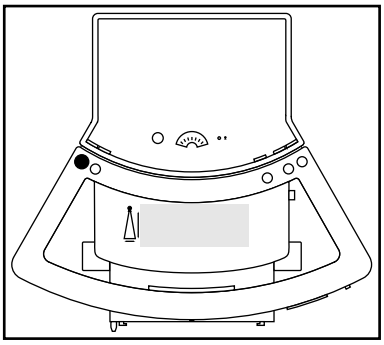
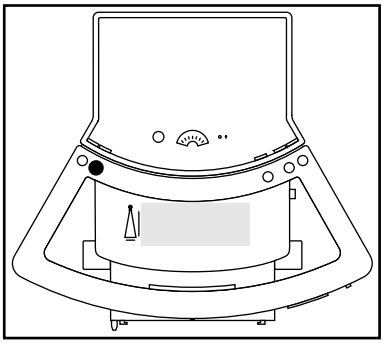
Key/display	Description
	Switch light field indicator and both laser ON (switches off automatically); SID laser is even lit at ”free“ cassette
	Indication of angle when tube assembly is rotated
	Tube assembly selected
	Enable transverse tube assembly movement (blue)
	Enable longitudinal tube assembly movement (green)
	Enable rotation of the tube assembly round the column (violet)
	Enable vertical tube assembly movement (yellow)
	Enable tube assembly swivel round its transverse axis (black)

4 Operation

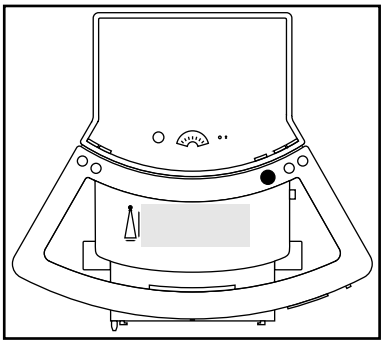
4.1 Tube assembly



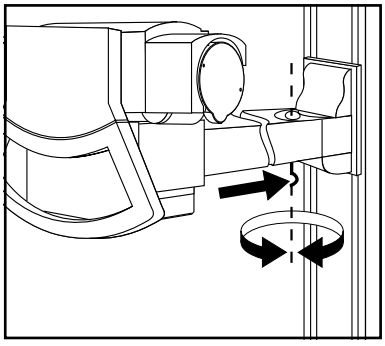
Move tube assembly transversely (blue).
LED lights up when locked in place.
Tube arm with telescope extension.



Move tube assembly longitudinally (green).
LED lights up when locked in place.



Swivel tube arm (purple)
- electrical enable
  LED lights up when locked in place.



- manually

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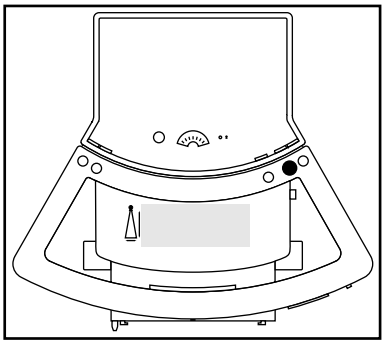
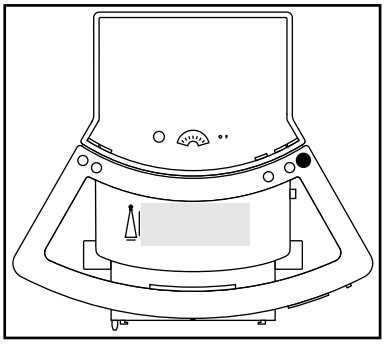
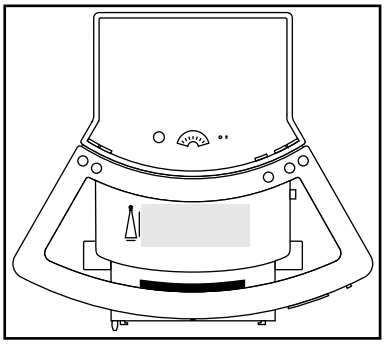


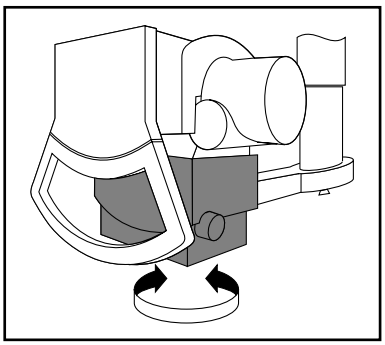
Raise/lower tube assembly (yellow).
LED lights up when locked in place.



Swivel tube assembly round its transverse axis (black);
The scale indicates the angle.
LED lights up when locked in place.



Move tube assembly freely:
- longitudinally **and**
- transversely **and**
- vertically.
  Lock-in/braking positions (if set) in
  - centre position
  - parking position
  - SID position.



Rotate collimator
colllimator locks in place at standard lock-in position.

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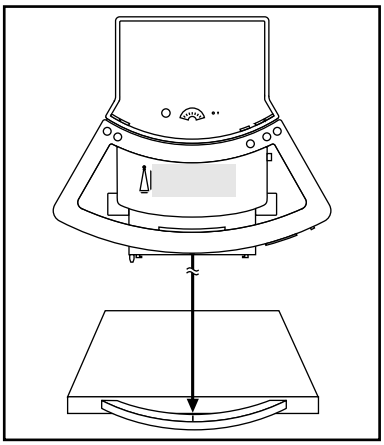
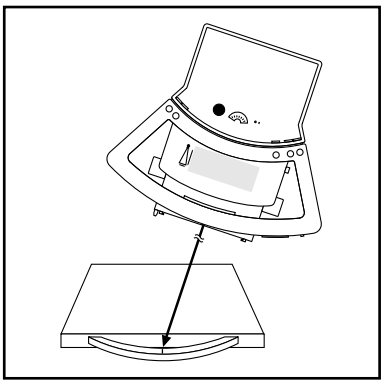
4.1.1 Centring the tube assembly on the Bucky

Do not look directly into the laser beam.



Centre position

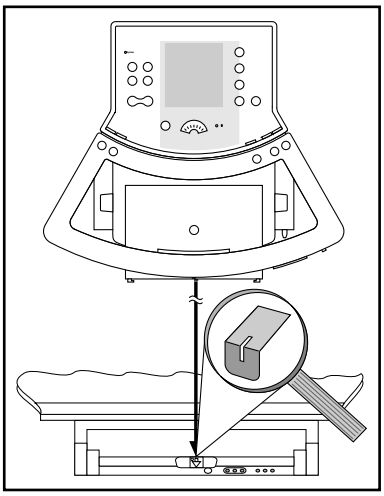
- Lock in tube assembly longitudinally and transversely
- Set the central beam axis to vertical
- Rotate the collimator so that the sides of the radiation field are parallel to the table edge
- Move the Bucky carriage to the centre position



At the patient table outside the centre position

- Switch on the centre laser:
  Move the tube assembly longitudinally to the table top so that the centre laser is aimed at the mark on the grip of the cassette tray or the centre indicator in the case of the automatic Bucky (central beam axis vertical or oblique).
  If the mark is concealed:
  - Pull the cassette tray out of the Bucky slightly
    or
  - move the table top transversely.

  Alternatively you can move the tube assembly instead of the table top. Provided you only move it transversely, the SID will be retained.



If you wish to continue working with **automatic cassette size sensing** the central laser must hit the image receptor vertically so that the size is collimated correctly.

Mode display: ”A“

”A“ means:

- vertical central beam axis
- correctly collimated size

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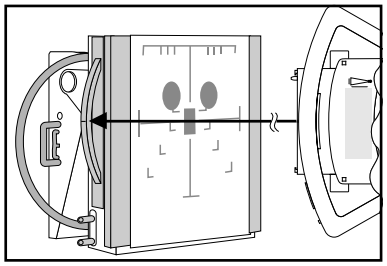
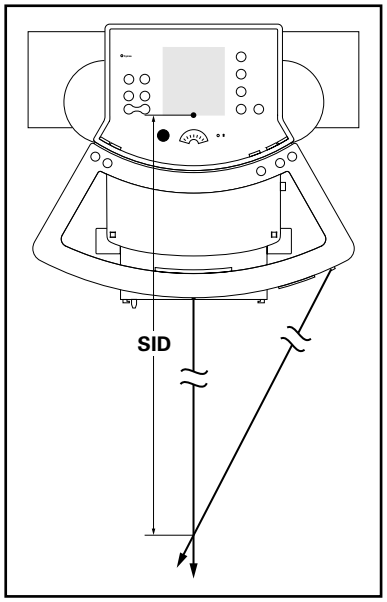


At the wall Bucky
Adjust the Bucky or the tube assembly so that the laser is aimed at the mark. For more information refer to the Instructions for Use for the wall Bucky.

With **automatic cassette size sensing** there is a lock-in position for the horizontal radiation beam axis (SID / VE+VT) and a lock-in position for the vertical axis (VT / centre position). With the horizontal object plate the automatic collimator control is only activated when the table top is at the bottom defined position.

Mode display "A"

4.1.2 Setting SID with second laser for free exposure technique[1)] and oblique exposures (optional)



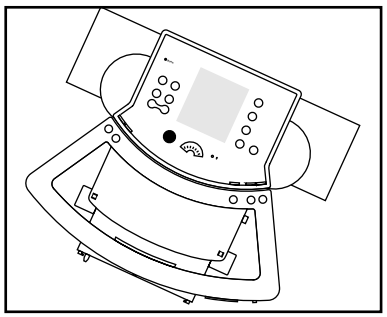
For the free exposure technique you can have a fixed SID set on your unit. For this purpose two laser beams, the centre laser and the SID laser (flashing), are adjusted so that the SID is defined by their point of intersection.

When making oblique beam exposures the SID laser is particularly helpful because you can set the SID at the same time as the angle. There is no need for measurement or correction.

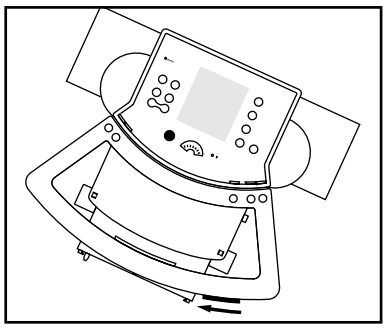
For a system with automatic collimation you must transfer the set SID to the system with the tape measure, so that the size of the radiation field can be displayed correctly.

Mode display "M"

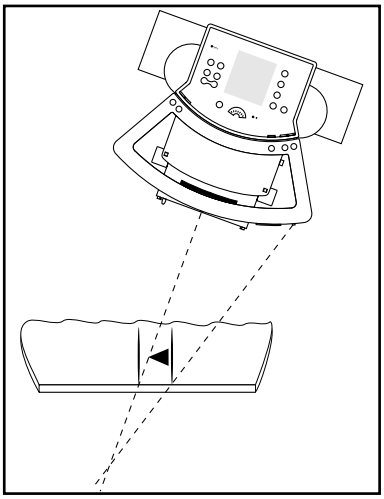
1) Free exposure technique:
Exposure directly on the cassette; you can use the MCS (Movable Cassette Stand) as cassette holder without automatic exposure control.



1 Switch on both lasers



2 Open exits if necessary

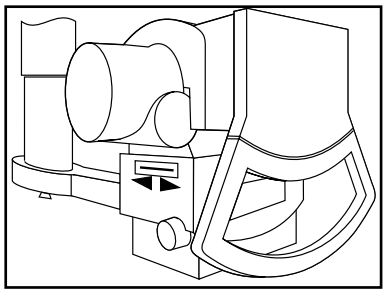


3 Rotate the tube assembly to the required angle, then move it horizontally and vertically so that the two light lines coincide.

4.2 Manual collimator

If your unit has the automatic collimator, read on in Chap. 4.3.

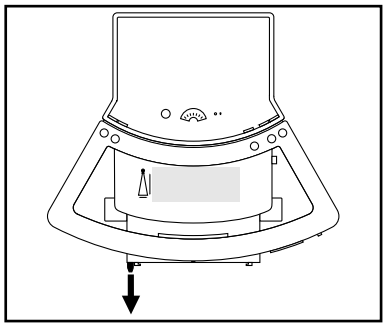
4.2.1 Selecting added filters



Philips recommends:
Use an added filter to reduce radiation exposure, especially for X-ray exposures performed on children.

0 mm Al
2 mm Al
0.1 mm Cu + 1 mm Al
0.2 mm Cu + 1 mm Al

4.2.2 Measuring the SID



1 Pull out the tape measure parallel to the radiation beam axis as far as the cassette

2 Read off the SID

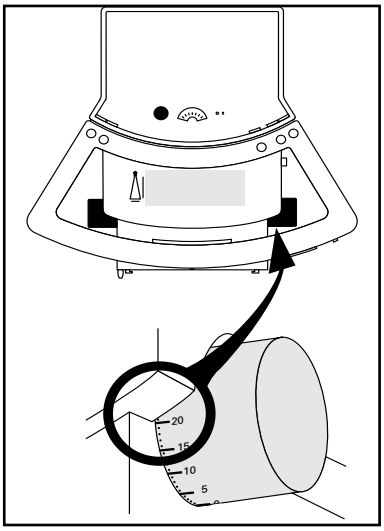
4.2.3 Collimation

Use the smallest possible collimation in order to avoid unnecessary radiation exposure and to achieve the best image quality (due to lower radiation scatter).

The following table shows you the values you must set on the collimator for a known SID and a known film size:

SID		maximal film size									
cm		13	18	20	**24**	25	28	**30**	35	40	43
100	40''	13	18	20	24	25	28	30	35.5	40	43
110	43''	12	16.5	18.5	22	23.5	25.5	27.5	32.5	36.5	39
115	45''	11	15.5	17.5	**21**	22	24.5	**26.5**	31	35	37.5
120	48''	10.5	15	16.5	20	21	23	25	30	33.5	35.5
150	60''	8.5	12	13	16	17	18.5	20	23.5	26.5	28.5
180	72''	7	10	11	13	14	15	16.5	19.5	22	23.5
200	78''	6.5	9	10	12	13	14	15	18	20	21.5
	inch	5''	7''	8''	9.5''	10''	11''	12''	14''	16''	17''
	SID	maximal film size									

Philips Medical Systems 5 Nov. 2003

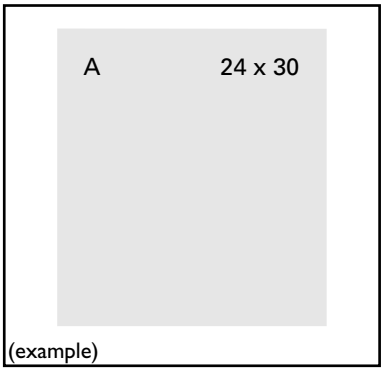


Example
(The relevant figures are highlighted in the table)

SID = 115 cm
Film size: 24 cm x 30 cm
Values to be set: 21 and 26.5

4.3 Automatic collimator

4.3.1 Cassette size sensing

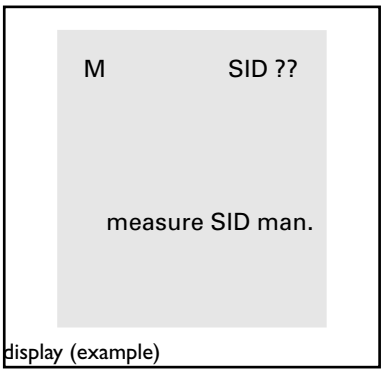


(example)

When the **radiation beam axis is perpendicular** to the image receptor, the system automatically collimates to the size of the cassette inserted. If you change the SID, the collimation will be adapted automatically (VE/VT lock-in positions).

⚠

With the combination of "Automatic beam limitation" and "Dose calculation and display", the system requires the current SID and the exposed film size. For this reason, with oblique projection and "free" cassette, you must transfer the SID to the system by measuring with the tape measure.



display (example)

When the **radiation beam axis is oblique** to the Bucky grid, the unit remains ready for exposure. You must collimate manually. Please use the tape measure (see Chap. 4.2.2). There are two possibilities:

- Starting point:
  - central beam vertical
  - cassette inserted

1 Swivel tube assembly
- collimation remains (incl. any additional manual collimation)
- system enable remains

- Starting point:
  - central beam vertical
  - no cassette inserted

1 Swivel tube assembly
- system collimates to 18 cm x 18 cm for the stored (last used) SID

2 Insert cassette;
system releases the exposure

If the unit does not detect any size, the collimator will close. For further information press (Test) .

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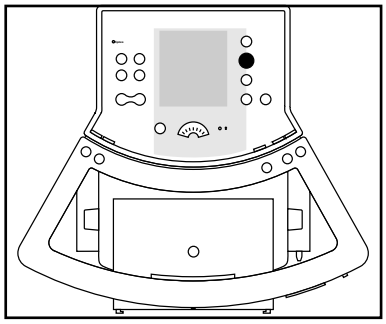
4.3.2 Selecting added filters

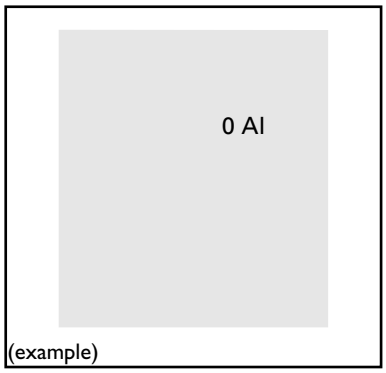


By repeatedly pressing this button you can select the added filters in the following order:

0 mm Al
2 mm Al
0.1 mm Cu + 1 mm Al
0.2 mm Cu + 1 mm Al

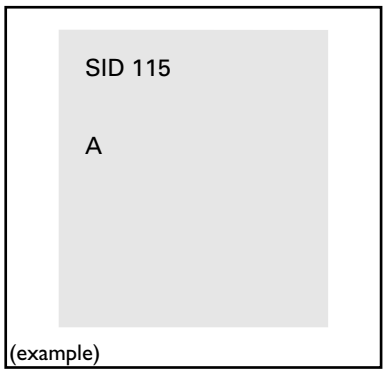
Philips recommends:
Use an added filter to reduce radiation exposure, especially for X-ray exposures performed on children.

With APR the system sets the programmed added filters automatically.



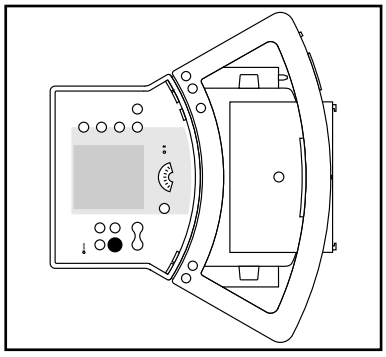
(example)

4.3.3 SID display



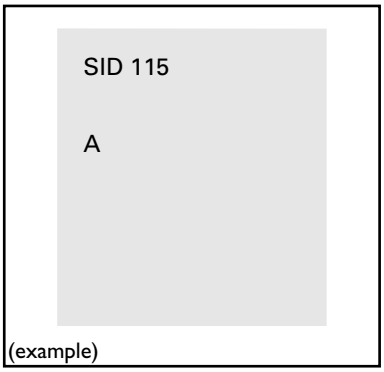
(example)

When the **radiation beam axis is vertical** (lock-in) and patient table is selected, the SID is measured and displayed automatically.

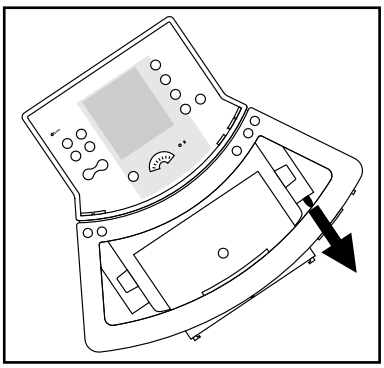


If the **radiation beam axis is horizontal** and if wall Bucky is selected, two arrows on the display indicate that you must move the tube assembly horizontally until the next valid lock-in.

After lock-in, the SID appears.



(example)

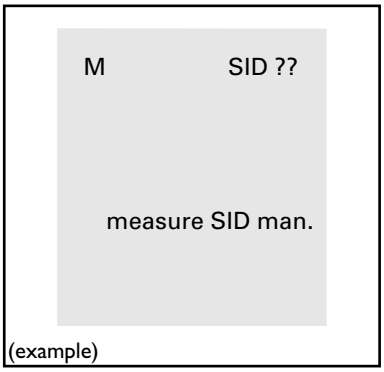


If the **radiation beam axis is oblique**, or when using ”free“ cassette, you have to use the tape measure.

1 Pull out the tape measure parallel to the central beam as far as the cassette centre

2 Hold the tape measure for about 1 s and wait for the beep; the SID is then stored and appears in the display field

3 Let go of the tape measure.
For an oblique beam exposure on the Bucky grid with cassette size sensing, the radiation field is collimated onto the inserted cassette and displayed.



(example)

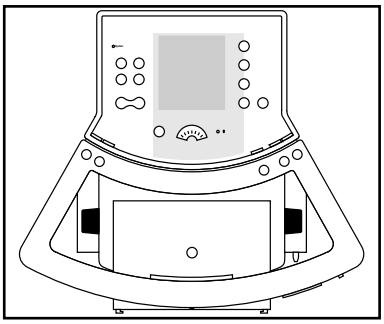
With a "free” cassette, the radiation field is collimated to 18 cm x 18 cm for the measured SID (no exposure beyond the cassette size occurs, as 18 cm x 24 cm is usually the smallest cassette used).

4 If necessary, collimate to the required radiation field size. The displayed size of the radiation field is valid for the displayed SID.

4.3.4 Collimation

Use the smallest possible collimation in order to avoid unnecessary radiation exposure and to achieve the best image quality (due to lower radiation scatter).

With PBL (Positive Beam Limitation)



1 Collimate manually
The light field indicator is lit.

⚠

If, when using the ”free“ cassette technique or with an oblique radiation beam axis, you change the SID after manual collimation, you will have to measure it again. The measurement is displayed.

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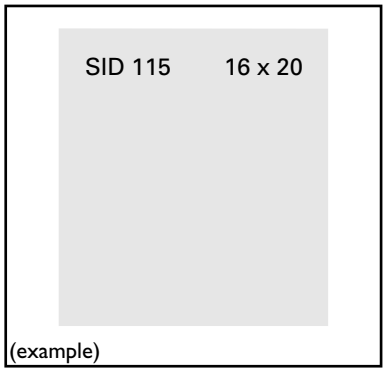
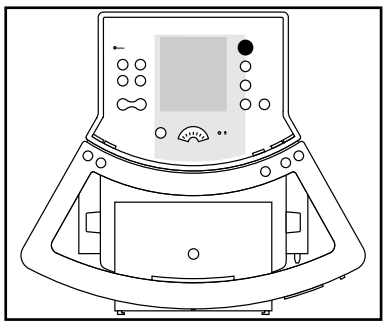


Return to manual collimation after the cassette changel



1 Press the button
In automatic operation:
the last manual collimation is set.
Press again to set the nominal
size of the cassette recognised.
In the case of tomography, manual collimation remains even after cassette change if the cassette size stays the same (size and position).

Please bear in mind:
At an SID of less than 97 cm the film size of 43 cm x 43 cm is not fully exposed.

4.3.5 The key-operated switch

(part of the "Automatic collimation" option)
You use the key-operated switch to
- switch the cassette size sensing device off and
- switch the automatic collimation off and
- switch the system over to manual operation.

You can then
- also use cassettes with non-standard size
- in the event of an error (e.g. if lead type which has fallen into the Bucky obstructs operation), also continue to work to a restricted degree at a casualty unit.

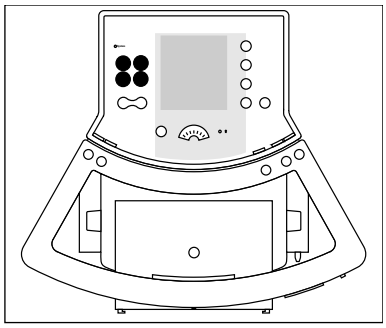
To make this operating mode clearly recognisable,
- you cannot remove the key
- the following appears in the display field
  - "Restricted use"
  - the telephone symbol
  - "M"

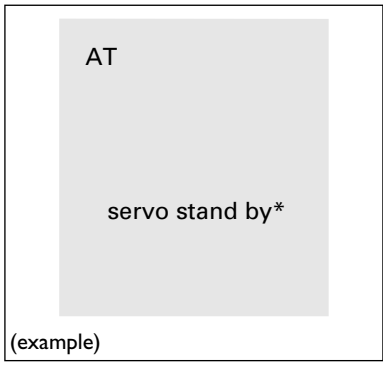
With manual operation
- you cannot select any APR programme on the control grip
- in tomography operation, the system checks whether all components are in the correct start position (tube assembly in the centre position, SID and table height correct, diaphragm opened, cassette inserted)
- the table unit and wall Bucky are always ready for exposure – as with a "free" cassette
- tracking is not active.

Philips Medical Systems 5 Nov. 2003

4.4 Operating the extended version

4.4.1 Selecting an auxiliary





(example)

You will also find the auxiliary buttons on the generator control desk.

The LED of the button pressed is lit.

Button/ display	Description
	AUX 1: Bucky in the table and tube assembly You will find more information in the Instructions for Use for the patient table.
	AUX 2: Tomography unit
	AUX 3: Tube assembly and wall Bucky You will find more information in the Instructions for Use for the wall Bucky.
	AUX 4: Tube assembly and ”free“ cassette Mode display always "M”

* If installed in the system

4.4.2 Auxiliaries 5 ... 8

If you wish to use more than four auxiliaries or to work with the BuckyDiagnost Trauma and/or Movable Cassette Stand (MCS) units:

You can set the combination of the tube assembly with four auxiliaries on the control grip. "Free” cassette is not possible with automatic exposure control.

A combination with BuckyDiagnost Trauma or MCS, including automatic exposure control, is possible. For this you have to switch over to a separate auxiliary (5 ... 8) on the generator. The collimator can still be operated.

You can recognise the possible combination with one of the auxiliaries 5 ... 8 on the control grip as follows:

- the LEDs for AUXs 5 ... 8 do not light up
- ○ lights up
- Mode display: ”M“
- APR cannot be selected
- Filter can be set
- SID can be measured
- Display for the radiation field: ”???“

If you have selected one of the auxiliaries 1 ... 4 on the generator, you can switch between these on the control grip. Auxiliaries 5 ... 8 can only be selected at the generator control desk.

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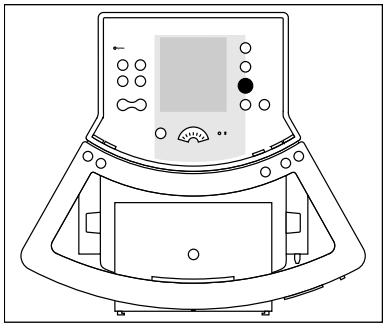
4.4.3 Selecting an APR programme

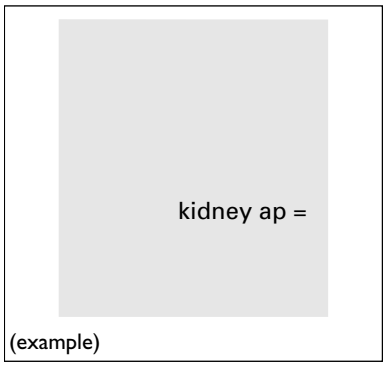
(Anatomically Programmed Radiography)



For each auxiliary there are four APR programmes available, which the Service Organisation can set according to your requirements. You can call up the APR programmes one after the other by repeatedly pressing the button.

"=" indicates that the APR programme applies to an exposure **with grid**.

You can select further APR programmes at the generator control desk. These appear on the display of the control grip too. You will find information in the Instructions for Use for the X-ray generator.



(example)

Ready for exposure
The system is ready for exposure when
- all components are in the correct position
- a cassette is inserted in the selected Bucky unit only
- no Bucky unit contains a cassette in the case of "free" cassette
- ○ ● lights up.

If the system is not ready for exposure you can call up a message by pressing (Test) . This message tells you why the system is not ready for exposure or what you have to do.

You will find a list of all the possible messages in the Appendix.

Philips Medical Systems 5 Nov. 2003

4.4.4 Tracking for the SID (optional)

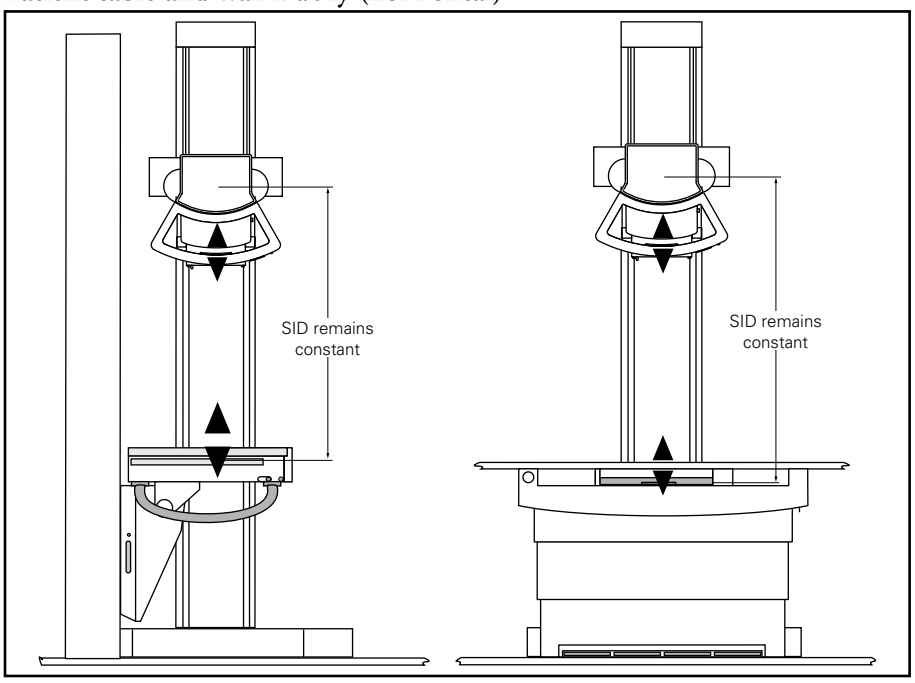
What you ought to know about the tracking function

- The tracking function can only be activated when the components of the system are at one of the 3 defined exposure positions illustrated.
- The tracking function is protected against collision. If the tube assembly meets an obstacle, it is stopped when a certain force is exceeded. It then moves back slightly.

Risk of collision and trapping fingers!

Observe the position of the patient and ensure unobstructed paths for the tube assembly.

Patient table and wall Bucky (horizontal)



Tracking at the patient table and wall Bucky with a vertical radiation beam axis.

The SID remains the same when you change the height of the table top or positioning plate under the following conditions:

- table top horizontal
- positioning plate of wall Bucky horizontal
- radiation beam axis vertical.

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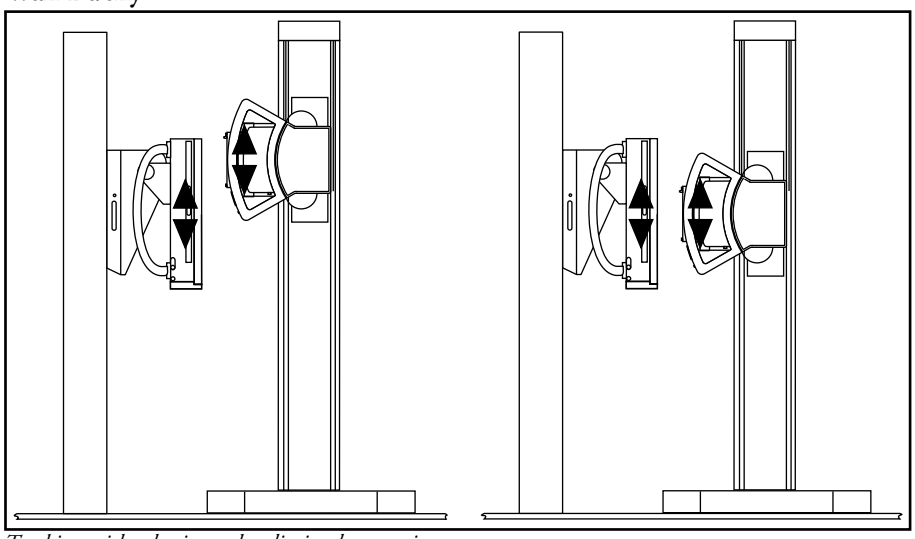
Wall Bucky



Tracking with a horizontal radiation beam axis;
left: off centre
right: centred

- If the cassette has been centred when inserting, the tube assembly will follow so that the radiation beam hits the centre of the cassette.
- If a portrait format cassette of at least 24 cm x 30 cm is off centre when inserted, the tube assembly will follow so that the top edge of the collimated field remains the same for manual collimation.
- With portrait size cassettes of less than 24 cm x 30 cm, off-centre collimation is **not** possible.

Capture range

All the messages appear on the control grip display.

- The ”Servo standby“ message indicates that for the auxiliary selected you can use the tracking function but the tube assembly is still far away from the exposure position. So that you do not have to move the tube assembly to the exact exposure position manually, there is a ”capture range“. As soon as the tube assembly is in the capture range, it is moved to the exact exposure position automatically.
- The capture range is above and below the set SID of the level of the radiation beam axis if the beam is horizontal. You can activate the tracking function by manually moving the tube assembly into the vicinity of the SID or the level of the radiation beam axis in the case of a horizontal beam, i.e. into the capture range. If you then let go of the button to enable tube assembly movements, the tracking function is activated and moves the tube assembly to the preset SID or to the level of the cassette if the radiation beam is horizontal.
- The capture range is set by Customer Service.
- Outside the capture range work is manual.
- In the case of ”free“ exposures with a vertical radiation beam axis you measure the focus-film (or cassette) distance with the tape measure (see Chap. 4.2.2). The tracking function then moves the tube assembly to your preferred height.

Please bear in mind that if the radiation beam axis is oblique the tracking function is switched off.

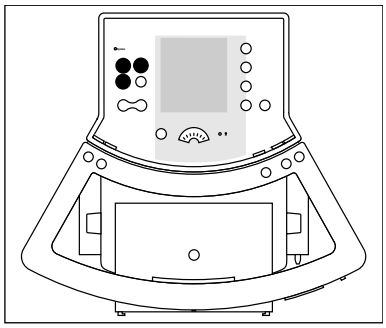
Philips Medical Systems 5 Nov. 2003

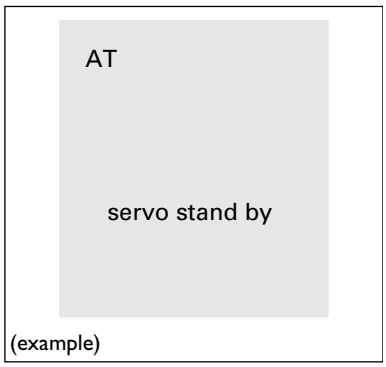
Tomography in combination with tracking

For tomographic movement there is a start position. The tracking device moves the centre locked tube assembly into the Tomo-SID lock-in position once. After the tomography unit is selected, the tube assembly moves into this position. The LED for the vertical lock-in lights up. You can change the table height on the BuckyDiagnost TH2 with the pedals at the table.

If you are unable to activate the tomography unit, an appropriate message will appear. You will find a list of all the possible messages in the Appendix.

Switching on tracking for the SID





(example)

You switch on the tracking by pressing a button for the AUXs twice. "Servo active" or "Servo standby" and "AT" appears. With tomography the tracking is adapted to the tomography conditions.

"Servo active":

- If the tube assembly is in the capture range, it moves to the exposure position.
- The tube assembly follows any adjustment to Bucky unit height.

"Servo standby":

1 Move the tube assembly into the capture range. You have reached it when "Servo active" appears.

Activating tracking

1 Select auxiliary at the control grip or at the generator control desk.

⚠

If you select the auxiliary at the generator control desk, the tube assembly and column may begin to move. Observe the position of the patient and ensure unobstructed paths for the tube assembly and column.

2 Press the button for the selected auxiliary again.

- "Servo active" appears.
- If the tube assembly was not in the exposure position, it will move to that position.
- If tracking cannot be switched on, an appropriate message appears. You will find a list of all the possible messages in the Appendix.

Changing auxiliaries

- When tracking is switched on you can change the auxiliary. Tracking remains switched on.

Switching off tracking for the SID

You can only switch off tracking when "Servo active" is displayed.
Press the button for the auxiliary selected. "Servo off" appears
or
raise or lower the tube assembly manually until "Servo active" appears.

Tracking is automatically deactivated if the servo is interrupted by

- releasing the central brake
- releasing the brake for "raise/lower tube assembly"
- rotating the tube assembly around the horizontal axis.

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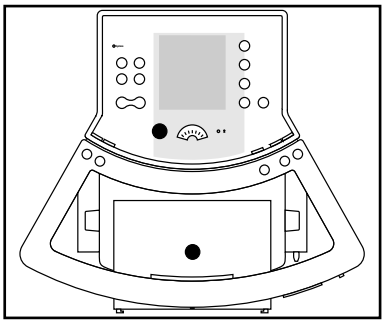
4.4.5 Tracking for the image receptor

(optional, part of the ”Automatic collimator“ and ”Tomography“ combination)

The servo for the image receptor only functions in systems with tomography and function enabled by Customer Service.

Preconditions:
- After switching on, you have to move the ceiling suspension unit into the centre position (locked in longitudinally and transversely).
- The radiation beam axis is vertical.
- The tube assembly is locked-in transversely if a grid is inserted.

Operation of tracking:



1 The carriage moves once with the centre of the image receptor under the central beam.

If the tube assembly is not positioned above the centre of the table, the carriage moves as far as possible under the central beam. The diaphragms automatically close so far that it is impossible to expose beyond the film. If the tube assembly is positioned too far away from the centre of the image receptor, the diaphragm closes completely and is no longer ready for exposure.

After pressing (Test) ”Move CS over Bucky tray“ appears.
The system is only enabled when in idle state. If the image receptor meets an obstacle it comes to a standstill and ”Maybe collision with Bucky tray“ appears.

Automatic collimation with manual longitudinal movement of the tube assembly

If the central beam does not meet the centre of the image receptor, the system collimates so that the radiation field will not be larger than the image receptor. If necessary, the shutters will be closed.

4.4.6 Tomography (optional)

Servo assist

In systems with tomography the following movements are servo-assisted to make operation more convenient:
- longitudinal movement of the tube assembly
- swivel movement of the tube assembly
- all movements of the Bucky carriage.

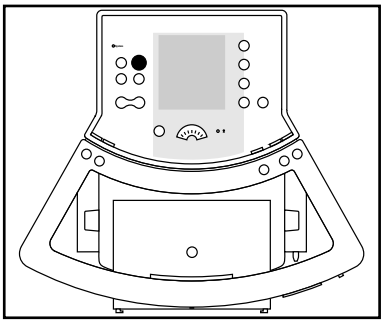
Servo for movements away from the centre position can be set by Customer Service.

Please bear in mind:
If you apply force during operation, the lock-in positions for the tube assembly swivel movement may change. If this has happened, swivel the tube assembly to the 0° position and lock it in place. The lock-in position will then be correct again.

Philips recommends:
Only switch the system off when all the movements are in lock-in positions. It is then easier for the system to start up again.

Philips Medical Systems 5 Nov. 2003

With tracking



1 Select AUX tomography unit,
With tracking switched on, the tube assembly moves to the tomographic height.

Without tracking:
- Set the Tomography SID
- Move the ceiling suspension unit to the centre position longitudinally and transversely (floor stand is locked-in when the corresponding LED is lit)

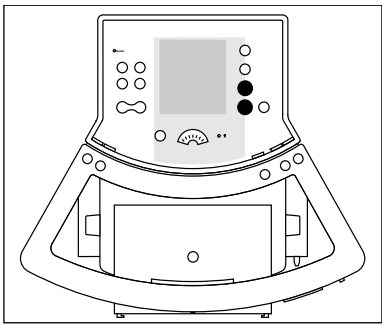
2 Set the tube assembly to 0° in all directions

3 Insert cassette

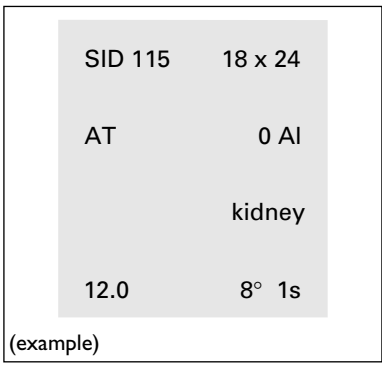
4 Position patient;
the measuring chamber label on the Bucky indicates the head and feet ends

5 Move table top to "tomographic height"

6 Collimate
When the cassette is changed, the collimation is retained if a new cassette of the same size and orientation is used. Otherwise the system automatically collimates on the new cassette.
- Use the last manual collimation: Memory



7 Select APR programme,
if necessary select a tomography programme. You can call up the APR programmes one after the other by pressing a number of times.



(example)

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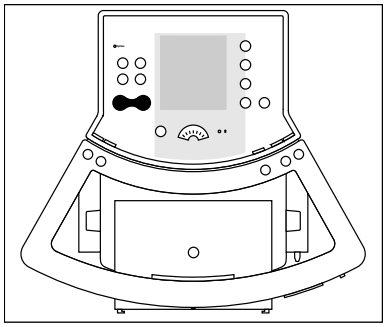
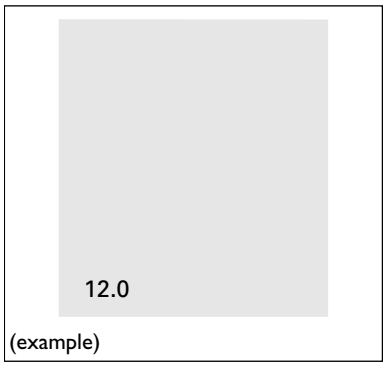




(example)

8 Set the tomographic height

Test run

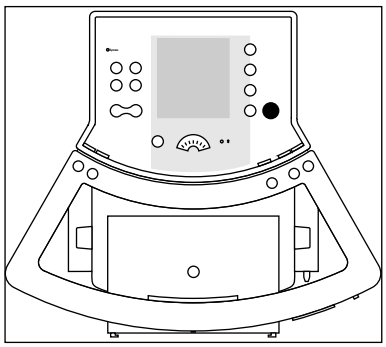
With a test run you can check your settings and prepare the patient for the movement of the unit.

Before you start the test run:

⚠

Remove all obstacles from the range of movement of the ceiling suspension unit and the Bucky and ensure that the patient is lying safely.

If ○ System is lit:



1 Start test run
If you cannot start a test run, the conditions not fulfilled will appear on the display. You will find a list of all the possible messages in the Appendix.

2 If necessary, change exposure data at the generator control desk.

If necessary, abort the test run:
- disengage the table top brake
  or
- raise/lower the table top
  or
- pull out the cassette tray
  or
- move out the cassette carriage.

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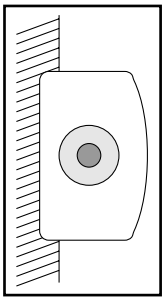
4.4.7 Releasing an exposure



If the Ready lamp is not lit at the generator control desk, you can press (Test)]to call up a help text on the control grip display (only on the extended version).

Keep the exposure button pressed until the end of the tomographic exposure (dead man's principle); if you do not, tomographic movement stops and radiation will be switched off.

4.4.8 In the event of an error

you can continue working with restrictions.

The key-operated switch

With this you switch the system over to manual operation.
Then

- you can also use cassettes with non-standard size,
- you can insert cassettes off-centre in the table,
- you do not have to bring the patient to another casualty workstation.

The automatic collimator "NICOL"

- A defective diaphragm control does not cause a failure as long as the light field indicator is operative.
- If the light field indicator fails, you can continue positioning – as with manual collimation. In this way you determine the image centre by means of the central laser. The size of the radiation field appears in the display field.
- If the display does not work you can control the size of the radiation field via the light field of the collimator.

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5 Maintenance

As with any technical appliance this X-ray equipment also requires
- proper operation,
- regular testing by the user,
- regular service and repair.

By taking these precautions you maintain the operability and operational reliability of the system. As the user of an X-ray unit you are obliged according to accident prevention regulations, the medical products law and other regulations to take such precautions.

Maintenance consists of **tests which the user can perform** and **maintenance** which is performed under service agreements, Philips service orders or by persons explicitly authorised to do so by Philips.

5.1 Tests by the user

The user must check the X-ray equipment for apparent defects (see table). If operational defects or other departures from normal operational behaviour occur, he must switch off the X-ray unit and inform the Service Organisation. He may only resume operation of the X-ray equipment when it has been repaired. Operation using faulty components may lead to an increased safety risk or unnecessarily high exposure to radiation.

Interval	Scope	Method
Daily	Stability test	
Daily	Faulty display lamps, damaged components, labels and warning signs	Inspection
Daily	Irregularities in the displays (flickering, failure)	Inspection
Daily	SID measurement at the automatic collimator	Inspection
Weekly	All cables and terminals (damage, breakage)	Inspection
6 months	Centring aids for X-ray tube assembly and image receptor (marks, catches, contacts)	Inspection

5.2 Safety checks according to the Medical Device Directive

The safety checks cover operability and operational reliability. They must be performed at least every 2 years. These tests constitute part of our preventive maintenance under our service agreements. They cover

Philips Medical Systems 5 Nov. 2003

- visual checking for completeness and apparent damage or defects as well as soiling, sticking parts and wear and tear which may affect safety,
- testing the necessary monitoring, safety, display and indicating systems,
- measuring the safety-relevant output parameters,
- checking electrical safety as well as the operability of an internal energy supply,
- for the particular product other special technical tests according to the generally accepted standards of engineering practice,
- other necessary tests specified by the manufacturer,
- recording results and filing the test reports in the X-ray system manual (medical products logbook).

5.3 Maintenance

X-ray units contain mechanical components such as drive chains, ropes, steel strips and gears which are subjected to wear and tear due to operation. They include means of suspension for heavy components (e.g. image intensifier, X-ray tube assembly etc.). After a lengthy period of operation the safety of the suspension may be impaired by wear and tear (e.g. rope break).

The correct setting of the electromechanical and electronic assemblies affects the functioning, image quality, electrical safety and exposure of the patient and medical personnel to radiation.

Philips recommends you to
- **perform the tests indicated in the table on a regular basis,**
- **have the X-ray unit serviced by the Philips Service Organisation at least once a year. You must have heavily used X-ray equipment subjected to maintenance more frequently.**

In this way you avoid endangering the patient and you meet your obligations.

By entering into a service agreement with Philips you retain the value and safety of your X-ray equipment. All the necessary maintenance, including the safety tests for the purpose of preventive avoidance of danger and the necessary settings for optimum image quality and minimum exposure to radiation, are performed at regular intervals. Philips agrees on these intervals with you, taking the legal requirements into account.

Faulty components which affect the safety of the X-ray equipment must be replaced by genuine spare parts.

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5.4 Recording results

Service and repairs must be entered in the medical products logbook, including the following data:
- type and scope of work,
- if necessary, details of any changes to ratings or the working zone, date, person performing the work, signature.

5.5 Cleaning

Please bear the following in mind when choosing a detergent:
To clean plastic surfaces you must never use anything other than soap and water. If other detergents are used (e.g. with a high alcohol content) the material will become matt or tend to crack. Never use any corrosive, solvent or abrasive detergents or polishes.

When cleaning, please observe the following:
- Before cleaning the X-ray equipment switch off at the mains. The capacitor may still be live 4 hours after switching off.
- Ensure that no water or other liquids can enter the X-ray equipment. This precaution prevents electrical short-circuits and corrosion forming on components.
- You should wipe enameled parts and aluminium surfaces only with a damp cloth and mild detergent and then rub with a dry woollen cloth.
- Rub down chrome parts with a dry woollen cloth only.

5.6 Disinfection

The method of disinfection used must conform to the legal regulations and guidelines regarding disinfection and explosion protection.

Never use any corrosive, solvent or abrasive detergents or polishes.

If you use disinfectants which form explosive mixtures of gases, these must first have evaporated before you switch the X-ray equipment on again.

- Before disinfecting the X-ray equipment switch off at the mains.
- You may disinfect all parts of the X-ray equipment, including the accessories and connecting cables, by wiping only.
- Disinfection by spraying is not to be recommended because the disinfectant may enter the X-ray equipment.

If you perform a room disinfection with an atomizer, you must switch off the X-ray equipment first. When the X-ray equipment has cooled down, cover it over carefully with a plastic sheet. When the mist of disinfectant has subsided you can remove the plastic sheets and disinfect the X-ray equipment by wiping.

Philips Medical Systems 5 Nov. 2003

6 Technical data

Power supply	Mains connect.: 230 V +10 %/-15 % 50 Hz/60 Hz ±2 Hz Current input: ≤2.5 A
Ranges of movement	
longitudinal	2760 mm
– with extension	4130 mm
transverse (optional)	150 mm
vertical	1600 mm
Lock-in positions	Can be set by the Customer Service:
longitudinal	Centre BuckyDiagnost TH2/TF Centre BuckyDiagnost VT "horizontal"
Range of X-ray tube assembly swivel round the	3 SIDs for BuckyDiagnost VE/VT "vertical"
– vertical axis (swivel of the tube arm)	±90°, lock-in pos. 0°, ±90°
– horizontal axis of the tube arm	2 x 125°, lock-in pos. 0°, ±90°
Collimator	manual/automatic
Inherent filtration	approx. 0.3 mm Al/100 kV (IEC 60522/1999) This value depends on the collimator and may be different; you will find the exact figure on the type number plate.
Max. angle of aperture	2 x 14.4° (usable range depending on the tube)
Rotation	±45°
SID measuring range	70 cm ... 205 cm with automatic collimation
Timer switch for light field indicator and light pointer	each programmable
Added filters	0 mm Al (0,0) 2 mm Al (2,0) 0.1 mm Cu + 1 mm Al (3.7) 0.2 mm Cu + 1 mm Al (6.0)
Tube assembly	
Inherent filtration	2.5 mm Al/75 kV (IEC 60522/1999)
Weight	285 kg

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Tomography programmes

You can have four of the following tomography programmes set by Customer Service with tomographic heights from 10 to 250 mm in 1 mm steps:

Tomographic thickness ≥5 mm			Recommended combination
1.	8°	0.8 s	
2.	8°	1 s	*
3.	8°	2 s	
Tomographic thickness ≥2.2 mm			
4.	20°	0.8 s	
5.	20°	1 s	*
6.	20°	2 s	
7.	20°	3 s	
Tomographic thickness approx. 2 mm			
8.	30°	0.8 s	
9.	30°	1 s	*
10.	30°	2 s	
11.	30°	3 s	
12.	30°	4 s	
Tomographic thickness ≤1.8 mm			
13.	40°	1.2 s	
14.	40°	2 s	*
15.	40°	3 s	
16.	40°	4 s	

Compatible equipment

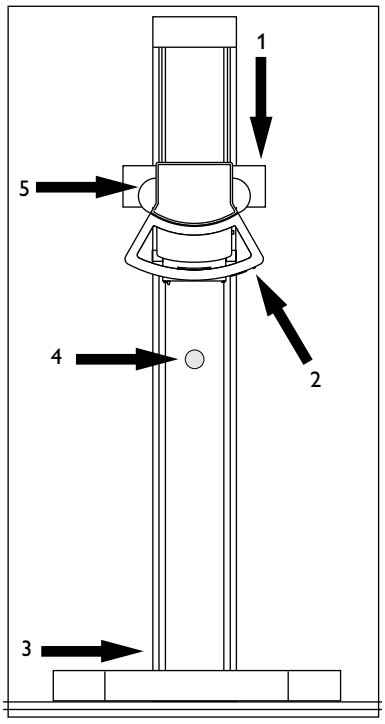
Generators
- Optimus
- MEDIO
- SCP versions

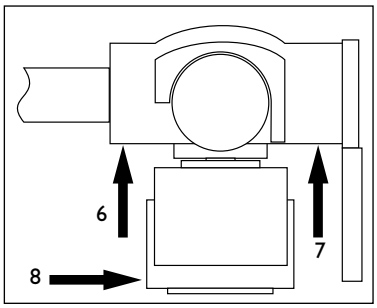
System components
- X-ray tube housing ROT 350
- Collimator with light field indicator, manual or motorised
- Lock-in positions for longitudinal and transverse movement
- DIAMENTOR

System options
- Size sensing combined with automatic collimation
- Tracking combined with automatic collimation
- Tomography combined with BuckyD. FS S, BuckyD. TH2 or BuckyD. TF and the generators OPTIMUS 50/65/80.

Accessories for tube carriers
- Rail extension for BuckyD. FS S and BuckyD. FS C.

Philips Medical Systems 5 Nov. 2003





Labels

The system is put together according to the customer's requirements, so the labels shown are only samples. Country-specific labels are only shown in the corresponding Instructions for Use.

1

PHILIPS

Philips Medical Systems DMC GmbH
Röntgenstraße 24
D-22335 Hamburg/Germany

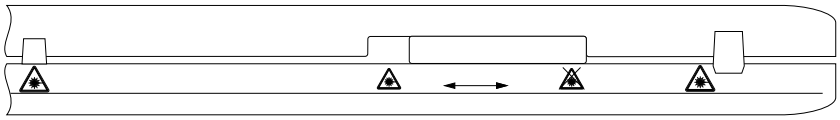
X-RAY TUBE HOUSING ASSEMBLY RO 1750 ROT 350

type	9890 000 86281	PERMANENT FILTRATION 2,5 AL/75
s/n	xxxxx-xxxxxx	Normal voltage 150 kV
Tube type	9890 000 85271	☐ 0,6 IEC 60336 ■ 1,2 IEC 60336 CE 0123
s/n	xxxxxx	

This Product complies with the DHHS requirements of 21 CFR Sub-Chapter J
Manufactured: February 2003

C CLASSIFIED UL US
X-RAY EQUIPMENT WITH RESPECT TO ELECTRICAL FIRE SHOCK AND MECHANICAL HAZARDS ONLY
<641B>

2



3

CE 0123

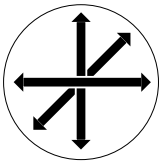
CCC

C CLASSIFIED UL US
- MEDICAL ELECTRICAL EQUIPMENT -
CLASSIFIED WITH RESPECT TO ELECTRICAL SHOCK, FIRE, MECHANICAL AND OTHER SPECIFIED HAZARDS ONLY IN ACCORDANCE WITH UL 2601-1, CAN/CSA C22.2 NO. 601.1-8D20

PHILIPS	Philips Medical Systems DMC GmbH Röntgenstrasse 24 22335 Hamburg/Germany
type 9890 010 8365. s / n yy.00.nnn BuckyDiagnost FS	230 V~ 50/60 Hz 2,5 A
Class I - TYPE B IEC 60601-1	Associated equipment IEC 60601-2-32:1994

type 4512 201 01841
s / n yy.00.nnn
Stand FS-S

4

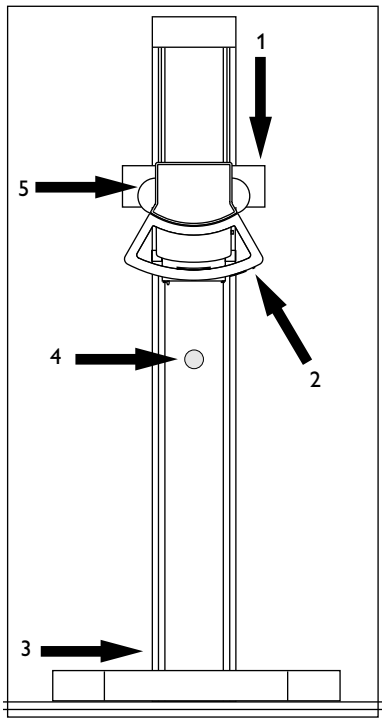


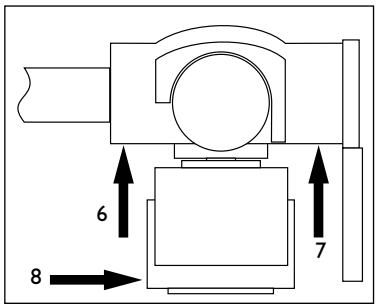
5

BuckyDiagnost

6

type 4512 130 2254.
s/n yy.00.nnn
STRAHLERTRAEGER ZUS.





7

type 4512 201 0234.
s/n yy.00.nnn
control grip NICOL

Philips Medical Systems
DMC GmbH
Röntgenstrasse 24
22335 Hamburg/Germany

This product complies with the DHHS requirements of 21 CFR Sub-chapter J
Manufactured: month YYYY

CAUTION

LASER RADIATION
DO NOT STARE INTO BEAM
MAX. OUTPUT < 1 mW
EMITTED WAVELENGHT 670 nm
FDA CLASS II LASER PRODUCT

LASER RADIATION
DO NOT STARE INTO BEAM
CLASS 2 LASER PRODUCT
IEC 825-1:1993
MAX. OUTPUT < 1 mW
EMITTED WAVELNGTH 650 nm

8

Philips Medical
Systems Nederland B. V.
Veenpluis 4 – 6
5684 PC Best
The Netherlands

INHER. FILTRATION
0,35 mm AL/130
IEC 522/1976

Manufactured
Month yyyy

24 V DC 5 A
12 V DC 9 A

TYPE: 9896 010 2200.
s/n:

CERTIFICATION This Product complies with thePerformance Standard under the Radiation Control for Healthand Safety Act of 1968, applicable at date of manufacture.

c US

PHILIPS
Made in Holland

7 Appendix

7.1 Messages

- Messages in conjunction with the telephone symbol are only for Customer Service (except for operation with key-operated switch). Please note down these messages for Customer Service.
- Messages according to BuckyDiagnost CS2/4 have not been changes in the control grip display. At the floor stand BuckyDiagnost FS the abbreviation ”CS“ means ”floor stand“ resp. ”tube assembly“.

Component	Message	Remarks
General	This aux. unit is not available	Chose another auxiliary
	Grid was not released	Error in the Bucky grid, reinsert cassette, if necessary call Customer Service
	Insert cassette	–
	Insert cassette again	–
	The cassette is already exposed	Insert unexposed cassette
	SID too small	Raise tube assembly
	No Bucky servo	Motorised drive of the image receptor carriage has failed, call Customer Service
	Insert cassette centric	–
Tracking	Servo active	–
	Wallstand tilted	Set cassette tray to 0° or 90°
	Tube not at 0°	Set central beam axis vertical
	Tube not at 90°	Set central beam axis horizontal
	SID too small	Measure SID again, zoom, if necessary
	CS at limit	The tracking range of movement is smaller than the manual range of movement; move column out of the boundary area.
	Servo stand by	Move tube assembly into the capture range
	Press button again to servo	Select auxiliary again
	Servo off	Select auxiliary
	No servo for this device	–
	Servo not ready please wait	–
	Servo active please wait	–

Philips Medical Systems

Component	Message	Remarks
Tracking image receptor	Maybe collision with Bucky tray	Image receptor carriage is obstructed in continued running, remove obstruction
	Bucky is moving please wait	Wait until the end of the movement
	Move CS over Bucky tray	Move the tube assembly over the image receptor
	Grid exposure CS trans not locked	Move tube assembly to the image centre
	Press test for reference run	System is not ready for tracking image receptor Move tube assembly and image receptor to centre position
	Invalid cassette	Use a larger cassette size
	Tomo defect ☏	–
	Check field size	–
Key-operated switch	Restricted use	Manual operation, call Customer Service
Wall Bucky	Cassette still in the table	Remove (second) cassette from the table
	Bucky unit not at fixed position	Locate table top horizontally or vertically
	Lock CS in long. direction	Movement in the fixed mounted rails
	Lock CS in trans. direction	Movement in the ceiling suspension unit
	No wall cassette	Insert cassette
	Move CS over WS	Move tube assembly centrally over the table top

Component	Message	Remarks
Tomographic unit	No exp. release from generator	Release ready for exposure
	Exposure aborted at the generator	See Instructions for Use for the generator
	Press test for reference run	Demonstrate the tomographic movement to the patient
	Center floor stand in long. direction	Movement in the fixed mounted rails
	Center floor stand in trans. direction	Movement in the ceiling susp. unit
	Move tube ass. into SID	Movement in the telescopic tube
	Raise tube assembly	Movement in the telescopic tube
	Lower tube assembly	Movement in the telescopic tube
	Set tube assembly to 0°	Movement around the horizontal axis
	Lock CS arm hor. rotation	Turn the tube assembly round the stand so that its longitudinal axis points in the same direction as the longitudinal direction of the table
	Raise table top	–
	Lower table top	–
	Gen. preparation signalled	–
	CS long is still unlocked	Engage the floor stand in the longitudinal direction
	Preparation tomo please wait	–
	Tomo active in the other room	–
	Aux. unit changed at the generator	Wait until tomography is released During tomography the auxiliary has been changed at the generator control desk; repeat exposure
	Table top brakes released	During tomography the table top has been moved; repeat exposure
	Tomo run aborted at the generator	–
	Bucky drive is defect	Call Customer Service
Bucky table	Cassette still in the wall stand	Remove (second) cassette from the wall Bucky
Automatic Bucky tray	Insert grid	APR programme with grid selected
	Remove grid	APR programme without grid selected
	False APR set	APR record does not match Bucky, call Customer Service
Combination tube assembly with AUX 5…8	Select aux. unit at the generator	Control grip operates AUXs 1 … 4
Manual operation with automatic format sensing	Measure SID man.	Use tape measure
Automatic format sensing/ NICOL	SID too small	The film size used is not illuminated
	Enlarge long. field size	Pair of diaphragms longitudinally closed
	Enlarge lat. field size	Pair of diaphragms laterally closed
	Limit coll-light use	Allow the light beam lamp to cool

Philips Medical Systems

Index

A

Added filters 23, 25
APR programme 29
Automatic Bucky 12
Auxiliary 28

C

Capture range 31
Cassette size sensing 24
Centre position 20
Collimation 11, 23, 26
Collimator 10, 24
Colour-coding 11
Control grip 10, 13, 14, 16

F

Floor rails 10

G

Grid 12, 29

K

Key-operated switch 13, 27, 36

M

Mode display 13

P

PBL 11

S

Servo assist 33
SID 21, 23, 25, 30
Stand 10
Swivel joint 10

T

Test run 35
Tomography 12, 32, 33
Tracking 13, 30, 32, 33
Tube arm 10
Tube assembly 10

V

Vertical carriage 10

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Let's make things better.